REMARKS

In the Drawings:

Figure 1 has been deleted and replaced by Figure 1a and Figure 1b.

The graphics in Figure 1a are the same as the deleted Figure 1 except that the coloring is different and the via holes are absent. Thus, Figure 1a serves to illustrate the metalized regions on the front side of the element of the invention.

The graphics in Figure 1b are the same as deleted Figure 1 except that shading has been added to distinguish the various parts of the metalized region on the front side of the element of the invention.

The labeling of Figures 1a and 1b now more clearly identifies the parts of the invention on the front side of the element.

Figure 2 has been deleted and replaced by Figure 2a and Figure 2b.

The graphics in Figure 2a are the same as the deleted Figure 2 except that the via holes are absent. Thus, Figure 2a depicts the metalized regions on the reverse side of the element of the invention.

The graphics in Figure 2b are the same as deleted Figure 2.

The labeling of Figures 2a and 2b now more clearly identifies the parts of the invention on the reverse side of the element.

In the Specification

Corrections have been made for spelling and grammar errors and for clarity.

The spelling and grammar others are not listed below as the inventor believes these will be clear from the context of the changes made.

The corrections for clarity are as follows:

1. Reference to Figure 1 has been replaced by Reference to Figures 1a and 1b.

2. As originally written, the specification described the use of three conductors. One conductor is a driven conductor (30) and the other is an undriven conductor (33). In the specification as originally written, the undriven conductor was referred to as "a second, linear, undriven conductor (33)" and as the "second undriven conductor".

As used in these instances, the word "second" is used to note that the second conductor is an undriven conductor and not to imply that there is a first undriven conductor and a second undriven conductor. In fact, no "first undriven conductor" was noted in the original description of the invention.

Therefore, for clarity, the word "second" has been deleted in those instances where it might be mistakenly implied that there is a first undriven conductor and a second undriven conductor. As corrected, the description of the invention more clearly speaks of a driven conductor and an undriven conductor.

The inventor respectfully requests that the Examiner accepts the deletion of the word "second" in the instances referring to an undriven conductor.

The third conductor described in the Specification is conductor (90) which is used to excite driven element (30).

3. In the first instance of the word "strips", the word "strips" has been replaced by the phrase "driven conductor strip and the undriven conductor strip" to clarify that the terms "strip", "conductor" and "conductor strip" are used interchangeably throughout the Specification in reference to driven conductor (30) and undriven conductor (33).

   The term "strip" is not used in reference to conductor (90). It should be noted that conductor (90) is used to excite driven element (30) and a practitioner of the art would not associate the term "strip" as used in the Specification with conductor (90).

4. The sentence "The antenna is typically half the length of a conventional antenna at this frequency." Has been moved for clarity only.

5. The following sentence was inserted into the specification: "And, in the example given, the width of the conducting strip is less than the width of the patches." This insertion clarifies that the preceding example supports the original claim for an antenna wherein the width of the conducting strip is more narrow than the width of the patch.

Claim Rejections

The applicant thanks the Examiner for reviewing the application.

The original claims have been cancelled and new claims proposed to overcome the rejections of the Examiner.

In regard to the Examiner's rejection of Claims 1-5 and 8 as being anticipated by Munson, the applicant respectfully disagrees.

The applicant respectfully requests the Examiner clarify the connection he has identified in Figure 2 or elsewhere.

The Examiner cites a second conducting strip (22) on the reverse side of the dielectric substrate (10) and via holes through said substrate in Figure 2 of Munson. Referring to Figure 2 in Munson, the applicant notes that strip (22) is not attached to substrate (10). Also, the only channel through the substrate which the applicant has been able to identify serves for the attachment of the coaxial transmission line 26, and not for a connection of conductors 12 and 14. In any event, applicant submits that conductors 12 and 14 do not form a folded dipole by any electrical connection which might exist between conductors 12 and 14.

In regard to Examiner's rejections of Claims 6 and 7. The applicant thanks the Examiner for bringing the Prior Art of Bishop to the Applicant's attention. Claims 6 and 7 have been deleted.

Applicant has submitted new claims which applicant believes will overcome the Examiner's objections.

REMARKS ON THE OFFICE ACTION

Item 7. The examiner rejected Claims 1-5 and 8 as being anticipated by Munson (USP 4,719,470), Figure 5. We thank the examiner for bringing this prior art to our attention. As described below, we feel that our invention is clearly different from that of Munson in both its geometry and its mode of operation; however, we acknowledge that the wording of our claims as originally submitted does not make the differences sufficiently clear. We propose additional wording to clearly distinguish our invention from the antenna disclosed by Munson.

With respect to claim 1, the antenna we disclosed differs substantially from those disclosed by Munson both in geometry and in mode of operation. Our claim 1, as originally written, required

> "(b) Two conducting patches on one side of said dielectric substrate"

Munson's Figure 5 is a group of four dipoles forming an array. The word "one", as used in the original claim, was intended to mean that the patches were on the same side as the driven conducting strip. Figure 5 clearly shows the patches within *each* dipole element being on *opposite* sides of the substrate. There are additional patches on the same side, but they are parts of entirely *separate* dipole elements. Our claim 1 is for a dipole element, not an array of dipole elements. This leads to a substantially different mode of operation: in Munson the feed is unbalanced while in our invention it is balanced. We propose additional wording to clarify that the patches are at opposite ends of the same, single dipole element.

Second, our claim 1 required

> "(c) a conducting strip, narrower than the patches, connecting the two said conducting patches, with a feed point at the center"

Munson's Figure 5 contains a conducting strip (16), with a feed point at the center (18). However, this entire structure is part of a microstrip transmission line over a ground plane, which does not radiate significantly, and is not part of the dipole element structure. Our claim 1 is for a dipole element, and is the main radiating component. The use and application of the conducting strip are completely different. We propose addition of the words "forming a radiating part of the dipole element" to make this distinction clear.

Third, our claim (1) required

> "(d) Slots cut into said conducting patches to effectively extend the length of the said conducting strip,"

The examiner refers to Col. 7, Line 57 of Munson as anticipating this feature. We respectfully suggest that the slots referred to in Col. 7, Line 57, are not cut into the patches, but instead into the ground plane, and furthermore are being used to radiate and increase the bandwidth, rather than to extend the length of the conducting strip.

Fourth, our claim (1) required

> "(e) A second conducting strip on the reverse side of said dielectric substrate, forming a parallel strip transmission line with said conducting strip and connected to said conducting patches through the use of via holes in said dielectric substrate."

The examiner refers to Col. 5, Line 47 and item (22) as anticipating this feature. Munson refers to item (22) as a reflective conductive surface, and the figures clearly show it as an entire ground plane rather than part of a dipole element. Again, we note that our claim is for a part of a dipole element. Also, our strip is *electrically* connected, in Munson the plane is merely in proximity. We propose to make this distinction clear by changing connected to "electrically connected" and "via holes" to "conducting vias".

With respect to claim 2, we acknowledge that if the reference to our claim 1 was not made, the description is too broad to distinguish it from prior art. The intent was to show that the one half of the element from claim 1 could be operated as a monopole. We propose improved wording of claim 2 to make this clear.

With respect to claims 3 and 4, we note our use of the word "parasitic", and note that all of the elements disclosed in Munson are driven elements rather than parasitic elements. We believe that this is sufficient to distinguish them from anything taught in Munson. However, we propose rewording of claims 3 and 4 similar to that proposed for claims 1 and 2, for further clarification.

We accept the examiner's objections to claims 5, 7, and 8, propose to withdraw claims 5, 7, and 8 entirely. We propose to retain the discussion and figures of these possible applications in our description as useful examples of how the invention of claims 1-4 could be applied in practice.

Item 8. The examiner states that claims 6 and 7 are anticipated by Bishop (USP. 6,337,666), Figures 6 and 7, disclosing a broadside array. We respectfully suggest that both of these figures disclose single elements, rather than a broadside array. Nevertheless, we propose to withdraw claim 6 because of its similarity to claims 5,7, and 8 which are also being withdrawn.

AMENDMENT

(1) A reduced size printed dipole antenna element comprising:

(a) A dielectric substrate,

(b) Two conducting patches, one at each end of the dipole element, on one side of said dielectric substrate,

(c) a conducting strip, narrower than the patches, connecting the two said conducting patches, with a feed point at the center, forming a radiating part of the dipole element.

(d) Slots cut into said conducting patches to effectively extend the length of the said conducting strip, and

(e) A second conducting strip on the reverse side of said dielectric substrate, forming a parallel strip transmission line with said conducting strip and electrically connected to said conducting patches through the use of via holes in said dielectric substrate.

(2) A reduced size printed monopole antenna as ~~in claim (1) further comprising a mounting on a ground plane~~, comprised of one half of the dipole antenna in claim 1, mounted on a ground plane, with said conducting strip driven and said second conducting strip connected to said ground plane.

(3) A parasitic reduced size printed dipole antenna element comprising:

(a) A dielectric substrate,

(b) Two conducting patches, one at each end of the dipole element, on one side of said dielectric substrate,

(c) a conducting strip, narrower than the patches, connecting the two said conducting patches, forming a radiating part of the dipole element.

(d) Slots cut into said conducting patches to effectively extend the length of the said conducting strip, and

(4) The parasitic reduced size printed monopole ~~antenna as in claim (3) further comprising a mounting on a ground plane~~ comprised of one half of the dipole antenna in claim 3, mounted on a ground plane,

~~(5) A Yagi-Uda type directional array comprising:~~

~~(a) Any number of parasitic reduced size printed dipole antenna element of claim (3); and~~

~~(b) the reduced size printed dipole antenna of claim (1);~~

~~whereby number of parasitic reduced size printed dipole antenna element and said reduced size printed dipole antenna are positioned on a substrate.~~

~~(6) A broadside array comprising;~~

~~(a) a first substrate having any number of reduced size printed dipole antenna element; and~~

~~(b) a second substrate with a feed structure whereby said feedstructure consists of parallel strip transmission lines~~

~~whereby said first substrate is perpendicularly connected to said second substrate.~~

~~(7) A stacked broad side array comprising:~~

~~(a) the broad side array as described in claim (6)~~

~~(b)a number of parasitic broad side arrays each comprising a number of the parasitic reduced size printed dipole antenna elements of claim (3) whereby they are positioned on any side of said broad side array.~~

~~(8) A stacked array of the Yagi Uda arrays as described in claim (5) whereby said stackcomprises of any numbers of said Yagi uda Arrays connected by a second substrate with a feed structure whereby said feedstructure consists of parallel strip transmission lines.~~

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